

I IRON

# DRAGON USER



*The independent Dragon magazine*

99p U563 25

January 1986

## Dragon Plus expansion

Advanced Basic  
programming

Dragon Joy

Communication



Melbourne House  
Special Offer!!



# DRAGON USER



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**Subscriptions**  
UK £14 for 12 issues.  
Overseas (airmail) £20 for 12 issues.  
0208 650-0717 Sales 200000  
Dragon User 1213 Little Newport Street,  
London WC2H 9PP

US address: 400 Business Park  
International 200 East 42nd St New York,  
NY 10017

A.B.C.

Published by Sunbeam Books, Book Press  
1000 10th Sunshine Books 1985

Typesetting by Cheshire Prints, Cheshire  
Prints, Poole by Grahame Harrison  
(Cheshire), Ltd., Southgate, Isle of Wight,  
Distributed by B&M Distributors, London  
SE19 1XH, tel. 0181 340 0040

Payment to the Post Office as a news  
agent

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More to submit articles

The quality of the material we can publish in Dragon User each month will, to a large extent, depend on the quality of the submissions that you can make with your Dragon. The Dragon computer was launched on 10th October with a powerful version of BASIC, but with very poor documentation.

Articles which you submitted to Dragon User for publication must be more than 500 words long. All submissions should be typed. Please leave wide margins and a double space between each line. Programs should, whenever possible, be computer printed on plain white paper and be accompanied by a copy of the program.

We cannot guarantee to return every submitted article or program, so please keep a copy. If you want to have your program reviewed you must include a stamped addressed envelope.

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## Editorial

The New Year has always been a time for looking back on the past 12 months and attempting to sum things up — so now seems a reasonable time to sit down and think about where you and your Dragon are going.

Why did you buy your computer? Is it the first place? As an educational tool? To play games? To mess around with code? Or maybe you just wanted to find out a bit about the new technology? Whatever the reason, well over a year after the Dragon was written off in many circles (and since then lesser computers have arrived on the scene and then vanished just as quickly — take the C16 for example), your choice of computer remains a valid one.

Education — you've only got to take a look at what the Spaniards are doing to see the potential. Games — the market may not be so prolific, but the quantity is there. Technical — powerful expansions and utilities abound. Curious — the Dragon's excellent Books and the wide range of add-ons currently available should keep you occupied. So what's keeping you from using your computer? At the 6000 show, one exhibitor said as he was optimistic but, "there are a lot of Dragons out there, stuck in the left" (he could be right...) but what on earth are they doing there?

It is a fact that in many ways there has been no better time to own a Dragon. So if you're reading this in the newsgroups and haven't touched a computer for months, take a closer look inside our pages, get the computer down from the shelf and treat yourself to a session on the keyboard this evening. And make 1986 the Year of your Dragon.

## The Dragon's Arm!

Luckate have been keeping themselves busy after launching their Dragon's Claw digital interface and Snap-Dragon visual system, the Cambridge based company are now offering a range of low-cost packages for experimental Robotics. These are based on the highly successful Beasty Arm from Beasty Robotics which has been available for the BBC micro and Spectrum for some time. All the control software necessary to drive the eight-channel Beasty arms controller through the Dragon's Claw is provided on cassette. The assembly instructions page into the

Claw and can be used at the same time as the Snap-camera thus creating the possibility of providing video guided control of the arm. The controller can handle up to eight standard model servos.

The actual Robot Arms is supplied in kit form and comprises a solid metal base and a collection of robust aluminium rods, and special plastic joint units. It is powered by standard servo control type model servos.

Luckate are offering two Robotics packages: a starter pack with 8Kb of memory and two servos at £70 plus VAT and a complete two axis

Robot Armkit including Beasty controller and three servos at £100 plus VAT. Both are available by Mail Order only from Luckate Ltd, PO Box 128, Cambridge CB1 1QD Tel 0223-866144 Visa and Access cards accepted.

At the same time Luckate are introducing a new implementation of their established Facial Systems system £3.95 running under Free for the Dragon/Tandy.

Luckate describe the key design objective of their Facial as user friendliness with no keyboard or mouse needed — comprising stage and the run-time stage, with 30 encoding



The Beasty Arm

registed in English. They also claim conforms very well to the ISO standard.

In other news from Luckate through Computerware, costing £75 plus VAT

## Road Show

Microsoft's recent ambitious Dragon Roadshow covering Manchester, Birmingham, Leeds, Nottingham and Cardiff all within eight days seems to have gone down well with the general public and established users alike.

The Roadshow was a great success' says Microsoft Marketing Manager Alan Kellie, with a good level of support at almost every venue. A sparse turnout at the Welshpool Hotel, Cardiff was attri-

buted to lack of publicity.

Many new Dragons were sold — with the 20 selling the £89 Colouring £10 worth of software and their policy for £12.95 (including £2 of software) and Microsoft's new titles such as Trekkers and Spacequest added to the popular.

Fans are already there for a follow-up Roadshow in the Spring. Microsoft can be contacted at 147 Ward Road, St Albans, Herts, SG1 2EE.

## Week-end away

The shortbreak holiday for Dragon enthusiasts which took place in mid-Wales over the last weekend of October proved to be an unqualified success for all participants, some of whom were not even Dragon fans! They had travelled from various parts of England and even Scotland to come from Wales for the first off Dragon rally.

First off it was, was staying by arrangement a second similar gathering will be taking place in the early Spring of 1986. Right from the start participants enjoyed their common interest — BBC computing, chess and methods were exchanged, board games and lots more in the early hours of the morning!

After very little sleep the group returned to base. Mr Ted Dwyer, managing director of Computerware gave an informed talk on the parallel processor of Dragon and

its development.

After a small pause Mr Rod Lloyd, Technical Director of Computerware took over and explained their company's link with Dragon which dates back to the days when they built not only the Dragon but also the Beast.

The audience lived up to expectations with many to keep our interest including a brief talk given by Mr Stan O'Byrne, Ted's brother and Technical Director of Compuware. He outlined the use of Options software, masters, bulletin boards and electronic mail via fax machines.

An evening meeting was spent talking — an early night was held by 11.30pm.

Then next day a planned walk was cancelled — once again the group gathered around the eight Dragons to discuss every last minute of the weekend until the next time.



Bob Kellie

There will be a next time, and we would happily welcome Tandy and other BBC devotees — and friends. For further details contact Bob Morgan, Marketing Information Officer, Merthyr Tydfil Tourism Council, Caerphilly, Dyfed, Glynneath, Gwynedd.

HERE IT IS! The 22 screen, 50 level, See-Sawing, Frog Slurping, Lilt Catching, Apple Munching, Mind Blowing, Eddie Guiding, Arrow Dodging, Mountain Jumping, Laser Zapping, Airship Gazing, Boulder Hopping.....

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# Letters

## Money Matters

WITH REFERENCE to Doug Henderson's letter (Dragon User November) I disagree with his opinion that Peter Whittaker should not charge £10 for a cassette of Wandsoc, also published in Dragon User.

Has Mr Henderson considered the cost of producing cassette programs for readers of a magazine as popular as Dragon User?

As Mr Henderson informs us cassettes do indeed cost £10. But printed newsletters cost another £10 each and a £10 stamp is also necessary. That brings the total cost for each issue received to at least £13.24.

Admittedly, there is the inconvenience for the user, who may buy the materials, type the program several times to ensure a good quality copy, not to mention the time and effort involved in writing the programs and article in the first place. For a program as comprehensive as Wandsoc this must have taken quite a while.

If Mr Henderson prefers to type in programs I am happy rather than pay £10 for the privilege of having a cassette sent to him; the choice is entirely his.

Otherwise would be justified if the price being asked was considerably higher but I for one feel £10 is a small price to pay for being in 1,000 copies of households numbers.

This is especially true when one considers that similar word processed programs cost rather more than £10, or even £20.

Stephen Williams  
Postbox 47  
Seven Wells

## NDUG

WITH REFERENCE to the letter from Martin Vernon-Jones (Page October 1985) I can't help wondering if Martin has anti-pollutionists like sufficient time at home that programming, etc., to attend one of the NDUG shows or even to read Dragon User. If he does I assume stronger than he doesn't

this is the chance to air your views — send your tips, compliments and complaints to Letters Page, Dragon User, 18-19 Little Newport Street, London WC2E 7PP.

I know that the National Dragon Users Group has been around since August 1984 and has a very healthy membership isn't?

Most of my queries have been covered in various issues of the group newsletter. Update... and it is possible that he could have asked himself a lot of work by joining us!

For the benefit of any other Dragon users who may not have received my letter I will do a short recap. Paul Stade, National Dragon Users Group 8. **Answers**, Read Writing Success, and we'll send you full details. Membership costs £7.50 per year (£8 outside the UK), and this gets you a monthly newsletter, help with hardware and software problems, advice and help with regular and quite specialised offers from various companies.

Paul Grace  
Chairman  
National  
Dragon  
Users

## Dragon Plus

I have received many letters and enquires about the Dragon model of the Infra-red carried by your local display unit. The Dragon which seems to be the major problem with Dragon both in domestic and other uses. Other people were concerned about the Dragon 30 and its future role.

Our new Dragon plus interface was designed for both 30% and 100% versions and gives the better display quality we all feel was needed. It also allows 30% owners to print the F1,F2 & F3 if they want to, or to add much needed memory to their computers. In addition our new expansion can save the cost of an additional disk and for gas elements as the extra memory is configured as a very fast RAM Disk when F1,F2 & F3 used. We are also working on DR30 drivers for release soon.

Our approach is to use existing cheap technology to give the many owners as practical the opportunity of upgrading. Your complaint of a reasonable cost, however Dragon Plus. Compuware does not own Dragon — some people tend to forget that!

May I thank all the readers who wrote to me. I have not

had time to reply to each person but I have read all these comments with great interest.

Ted Glynn  
Compuware Ltd  
Cottenham Mill

## Baudwalk

THANK YOU for mentioning my bulletin board in your November issue. There are some things that weren't mentioned that would be useful:

a The board runs at 300 baud using DCDT tones.

b Settings needed to access and 7 data bits, even parity and one stop bit.

c You don't need to have C64 to access the board — any communications software capable of the above will work.

Finally, another point for the system times are Wednesday and Saturday 1800 to 2000 and Sunday 1000 to 2000. The number is 0795 738525.

Jon Dusbury

(Group 65599)

## Dragon Beachhead

TO DRAGON Computers Ltd Could you tell me the names and addresses of games in my case. Plus I have noticed several games like Combat Link, Fighter Ace, Beam Rider, Kart Protocol and Ghostbusters.

Do you make any of these games?

Colin Jackson  
Dartmoor  
Cornwall

ACTUALLY, Colin, Dragon User has no connection with the people who make the Dragon Games, nor with any company which makes games for it — we are an independent magazine.

## Pokes

RE: Reply to Harry C. Taylor (October 1985 Dragon User), the following will be added to Steven Statherous's Dragon Library (June 1985 Dragon User):

185 POKE 30000 18 POKE 30000 18 POKE 30044 25  
POKE 30067 24 POKE 30072 26 POKE 30085 26

They will enable the program to be run with the Dragon 30+ plugged in.

Dragon 30+ users might be interested to note that the writer was typed using Peter Whittaker's word processor (September 1985 Dragon User). It is slightly different to any other wordprocessor I have used and once you get used to it, it definitely works.

How about listing a few Bulletin Board numbers?

Here are a few 24 hour 300 baud numbers (FAX):  
POKE 30070 18  
GOSPORT 3002 0000  
088 1204 0000  
TLC 01 300 3676  
ESTEC 010 31 1718 14260  
(HOLLAND)

Graham Smith  
3 Ashton Close  
Tunbridge Wells  
Kent TN2 7LE

## Pros & Cons

TO DRAGON Plus Expansion by Computer I am interested in the above expansion for my Dragon 30 and have received some information from Computer, but before I commit myself to purchase of same, I wondered if you have had a look at it and you had could you advise me of the pros and cons, as you may appreciate I do not like wasting money.

Mr D. Parker  
34 Aston Close  
Bromsgrove  
Worcestershire  
UK

Please further see for details Mr Parker.

## Epsom

THE ARTICLE "Curing The Blotches" by Peter Whittaker was in my opinion the best ever run in your magazine. However, for those of us with Epsom or Epson compatible printers, the program needs some alteration:

POKE 8411162 17  
POKE 8411163 17

The change in the "POKE command which my printer interprets as condensed mode to a more manageable DCF1 command.

Mike Hodges  
3 Littlestock Avenue  
Ashley Down  
Bristol BS7 9LE

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# Communication

Send us your questions, requests, and news to Communications,  
Dragon User, 1213 Little Newport Street, London WC2

Communication, as defined by the extremely small Pocket Oxford Dictionary, is the imparting or exchange of information — and this is what Communication in Dragon User will tell all about too. As commercial technical and software suppliers for our computer readers we get ever increasing amounts of mail on a variety of subjects, all asking for help and information — more than our Supreme Brain Judge could ever handle. So this is your chance to reach many thousands of Dragon partners who might be able to help you — and of course, if you can help someone — why not drop them a line? Here are the first few problems to look off — we'll be hoping to pass more in next month. Over to you.

## Dragon

Could ADY reader supply me with a Basic program to screen Dump from a Dragon 32 to a Tandy TRS-80 Colour Display

## Places

Any basic address would be appreciated.

J W Mathewson  
19 Crescent Gardens  
High Wycombe  
Buckinghamshire HP11 7PA

## Repairs

I think I am a Dragon User for two years (Dragon 32). I have now acquired a Amstrad CPC464. After perfect service it has now developed a fault. I returned it to Amstrad from where I was purchased — it was then returned to me unopened, stating that there was no place that now repairs or stocks Dragons. I write to you in the hope that

you could advise me at a repair shop or such in the North West or in fact anywhere.

M P Fries  
7 Weather Drive  
Cheadle Hulme  
South Manchester M23 2PR

## Music

WANTING TO broaden my Dragon Horizon the realms of music creation. I wonder if you could advise me as to whether there is a company that produces a Dragon Midi interface?

Peter Thompson  
132 Southgate Drive  
Westcliff-on-Sea  
Essex SS9 8SD

## Software

I AM writing for information on any software or hardware which will produce Drums and Synthesiser sounds for the Dragon 32. I have seen software for the Commodore and Spectrum — also a new synthesizer machine which produces Drum sounds. I would like to know if anyone has anything like this for the Dragon 32. Can you help?

Christopher Leslie  
3 Blythe Mills  
Hurstmoor  
Dorking  
Surrey RH5 2AP

## Communication

Stuck for a routine? Need some obscure equipment? Feeling out of it? Find out — someone can help you! Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 1213 Little Newport Street, London WC2H 7PF. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help this month!

## Problems

NAME \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
CITY \_\_\_\_\_  
POSTCODE \_\_\_\_\_  
TELEPHONE NUMBER \_\_\_\_\_  
E-MAIL ADDRESS \_\_\_\_\_

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# Dragon Plus

The ultimate expansion for the Dragon? *Ray Cotes checks it out*

COMPATIBILITY PROBABLY advances the "Dragon Plus" board as being the Ultimate Expansion for Your Dragon. This is a very bold statement indeed and so it was with great interest that I passed it down. It is interesting (Composers are very very generous with their sticky fingers).

The expandable add-on is a single, very professional looking circuit board about one inches square with a short ribbon cable connected to it. The board has been designed to plug directly into the Dragon's main circuit board, which is nice because the whole thing fits inside the Dragon's case and no messy ribbon connector connects the two. Instructions for installing the board may appear a little sparse at first, consisting of only a single sheet of paper but all the necessary information is present and includes diagrams and photographs of the final device. Provided that the care is exercised, the job is quite simple and should create no problems even for the most inexperienced user.

The principal components on the board include lots of dynamic RAM (64k), Video Display Generation (VDC) as used in the BBC monitor, an 80 column controller, the character set for the VDC, a 2k RAM chip which is used to store the information displayed by the VDC, and after installation, your 64k RAM and one of the Dragon's 64k ROM EPROMs.

There are three steps to installing the board. The first is to bypass a resistor on the Dragon's main PCB, the second is to fit the board itself, and the third step is fitting up the same moment socket. Obviously the first thing to do is to remove the Dragon's top cover and keyboard assembly to gain access to the main PCB. Once everything is out of the way then the work can begin.

The bypassing of the resistor involves simply soldering a short jumper across the legs of the component. This resistor sits at one end of the oscillator circuit within the Dragon and unless the jumper were fitted, a screen flicker may become apparent when using the 80 column display.

## Installation

The fitting of the board itself is very easy. Firstly the 64k chip must be very carefully removed from its socket and inserted into a new socket positioned on the expansion board. This is the part where the care must be exercised as the 64k chip is MERRY sensitive to handling and MERRY expensive to replace. The leg of the new 64k RAM chips must also be removed from the main PCB and inserted into a socket on the expansion board which now neatly fits

into the empty socket on the main PCB which was originally occupied by the 64k chip. Now the ribbon cable connects to the socket on the main PCB in place of the BASIC chips which were removed earlier. It is recommended that a little adhesive is used to secure the board in place and care must be taken to ensure that the underside of the board does not come into contact with any of the components on the PCB. This is not a problem as it is only a case of bending the odd capacitor so that it sits flat on the board.

Finally the extra monitor socket. A monitor is essential on any machine that uses an 80-column display as an ordinary television set will not display that amount of information clearly enough to be of much use. The obvious choice is to fit a D9 socket to replace the regular socket fitted by standard on the dragon. This will enable standard monitors to be used. When the socket is very easily removed you have access to a soldering iron. Two wires must be taken from the top left hand corner of the expansion board (which is clearly marked) — I have one the composite video signal and an earth wire. A third wire is taken from the back of the existing monitor socket to provide the sound output (Fig One).

## Features

(a) Installing the board is quite easy, but what does it offer? There is the 64k of RAM on the board which may be expanded as two banks of 32k by means of the RAM piping capabilities of the 64k chip. There is a 64k Video Display System (VDS) which will be used in the BBC monitor and which will give an 80 column by 24 line display. There is a 2k RAM chip on board which is used by the VDC so that none of the Dragon's RAM is used for display purposes. But the real power of the expansion board is demonstrated when the custom version of Composers' BASIC is loaded. FLEX is a standard Dragon is very powerful but in conjunction with this board several new features become apparent. The new FLEX uses the extra bank of RAM as a screen or virtual disk equivalent in size to 240 floppy disk sectors. This means you can imagine in very space while compared to an ordinary floppy disk one an access to data will be very much faster. The only problem is that with the virtual disk being rotated RAM is soon as the Dragon is

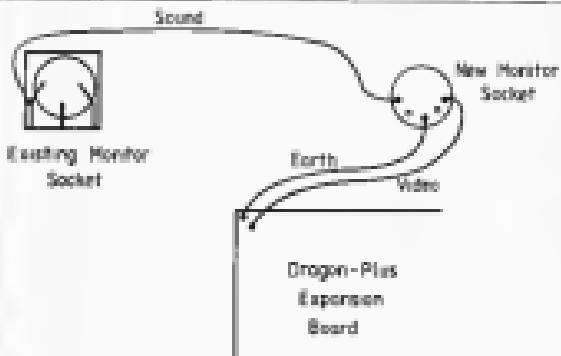
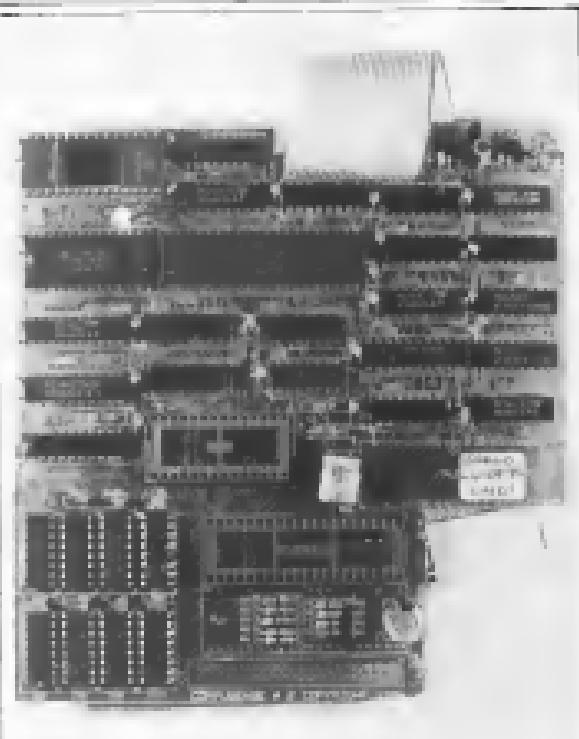


FIGURE 1



switched off at document as the virtual disk will be lost. This problem has, as a certain extent, been alleviated by Computerworx's recommended use of the virtual disk. Their example starts up the system as being the main system disk and then copies the files often used first such as the CAT and UST utilities from floppy disk to the virtual disk. This means that certain commands are executed almost immediately as there is no disk access required to read the command into the utility command space before the command may be executed. An example is the TSD editor which takes 1 second to load from floppy disk but only 2 seconds to load from the virtual disk. Although this is only a saving of 1 second, a program which requires 100 editor sessions (such as the assembler program) has one minute less time to waste than a short file using the original floppy based system but only 14 seconds using the virtual disk system. On a large file savings will obviously be even greater.

The FLEX system disk is supported (so far) under Dragon 32/64 using the standard **BOOT** command. A small delay here is that because the monitor needs to be connected to the new 80 column monitor socket the **BOOT** command has to be

entered typed directly on the monitor (plugged into the standard Dragon monitor socket).

The new version of FLEX allows you to assign a logical number to each device on the system. For example the virtual disk may be assigned as device zero and the floppy drives as a disk drive system, may be assigned the numbers one and two. Once the devices have been assigned a number they may then be assigned a function such as whether they are system or working devices. By assigning the system to be all drives the virtual disk will be serviced first followed by the rest of the floppy disk units. This measures the most often-needed test which have been moved to the virtual disk will be called every quarter whilst the lesser used ones will also be tested from floppy without the user having to specify a drive number.

The virtual disk may be treated in just the same way as an ordinary disk unit using the normal floppy based system but only 14 seconds using the virtual disk system. It is a saving of 14 seconds. On a large file savings will obviously be even greater.

The FLEX system disk comes with a customized version of CBASIC which has been updated to work with the 80 column

display so that BASIC users will benefit from the Dragon Plus as well as the dedicated Flex Fanatic. Most of the commercial software available for IT/EDX (and CBM) was originally written to be used with an 80 column display so there is no shortage of software available. Some of the packages currently available for the 80 column display including SP/EDX and the DB2 database system will (now) work perfectly.

## Conclusion

In conclusion, the board is manufactured to a very high standard using high quality components. There were no problems encountered fitting the board to the Dragon. The custom FLEX system worked from day one and the whole package worked first go. The 80 column display is very, very fast and exceptionally clear. The control codes which set up the various colour schemes on the 80 column screen display such as monochrome, etc have all been adapted to work with this new display. The Virtual Disk certainly gives the impression that you are using a real system and offers a lot more functionality than could normally be available. For the single floppy drive users nothing is more to like than this system it may be worth considering a Dragon Plus instead of buying a second floppy drive. As well as getting the much needed 80 column display, the equipment is cheaper, faster and quieter than a floppy drive and when the time comes to upgrade to an even bigger system the Dragon Plus board already has the connector ready in interface to Commodore hardware, something which should be available within the next few months.

Computerworx are currently perfecting a CBM based version of FLEX which will replace one of the BASIC programs so that the Dragonwill power as an office system which will support printer spooling. The ability to hot load a printer whilst running other software and avoid BASIC being required then (CBASIC will function as normal). Under many circumstances or other add-ons, you do not lose any software compatibility with the Dragon Plus system. It is still possible to use the Dragon as if no expansion board was fitted.

As far as the claim that this is the ultimate expansion for the Dragon, well at the present time there is nothing else comparable with it. Add to this Computerworx future plans and their claim may be a genuine one.

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# Advanced Basic

Work and play combined on the Dragon by Gareth Penfold

THE DRAGON has a very powerful Basic but poor documentation and there are a number of useful routines and commands not explained anywhere. This article describes some, with an example game program, some lesser known techniques available to tell whether or not they possess an assembler. The only machine code in this program are ROM routines that can be called from Basic with EXEC, and the short auto-run routine that works with any BASIC program.

The object of the game is to knock over three cities as plays progress (numbered 1 to 3) as long as you can. Trying very hard to stop you are the alien bombs that fall vertically from the top to the bottom of the screen, always ending up on a city — unless you destroy them on route.

This is achieved by moving your ship up and down on the left of the screen to be in line with the bomb and pressing the fire button. Easy! By the way, just to ensure that you don't delay the alien attack too much constantly manoeuvring for a shot will do you if you remain stationary for too long, it will tell the bombs different routes. The bomb drops before it flies, and the same target for the bombs to tell, disappears at each level. Only certain parts of the barge (the white panels) mean it hit, so good shooting is needed!

Pause and Reset features are written into the game. Simply press either P or R at any time. To start after Pausing press any key. Level 6 on the game is a bonus level — to see what I mean, select it and try. You will not last long.

The user can nominate any of line 3000 instructions for a key included in that part of the listing. I suggest that you type in DOTS 3000 as a direct command before running to give the program no idea it will auto-run. Type CLOADM to load the program once started this way.

I will now explain how the program works.

Welcome to the world of structured programming! This means that each section of the program has been made into a mini-program, or subroutine, each one being called with GOSUB and terminating with a RETURN command. The GOSUBs and the start of each subroutine are preceded with REM statements so that you can easily follow what is going on. Writing your own programs like this is not very hard once you get used to it and they are much easier to debug than spaghetti programs in with DOTS everywhere. They can also be quicker to run. There are a lot of REMs () in the program — these

can be left out if you wish.

LINES 10-180. This is the main control routine — it sets up a subroutine. Many of you will be puzzled by lines 120-140 and 170. The variable ?COUNT, THROTTLE and PINEAPPLE are set to -1 inside a subroutine and the DRAGON reads these lines.

IF ?COUNT=-1 THEN

This is because -1 is the code for true. This is hard to explain so try it yourself with the following:

LET A=3 PRINT A:3

-1 is the answer.

PINEAPPLE=0 indicating FALSE

I have just had trouble in pasting THROTTLE and PINEAPPLE messages between routines as it is easier to locate lines better and is slightly longer. IF NOT FINISHD or line 170 explores itself.

The same sort of thing is written in the double-lined check in line 2240 where DS is either 0 or 1. To fit the question in line 1180 or 120 for DS. Try this in your own programs.

Now for the subroutines

LINES 1000-1140 contain all I am sure all the code you know has had screen poxes. These are from 1000-1140 but the character codes are different from those ASCII equivalents. Also some very ASCII characters are available — such as in virus numbers and expanders etc.

LINES 1320-1440 and lines 1450-1520 are both routines for creating User Defined Characters. Obviously most of you have had to learn the secrets of these machines such as the Commodore 64 of the two bytes available on it. Well now you can create your own, and with a little C64 knowledge and control them just as well with GOSUB and PUT plus one of the ten options available (AND, NOT, AND, TO, OR, NOT, AND, OR, AND, NOT, AND). To create just wait USR64 with 0 for a mask word and 1 for a write mode: POKA=1-10. The number of rows after the DIMMING, SETTING and PUTTING and set the sub routine.

LINES 1600 contains CLOAD 34091. This calls a ROM routine that waits until a key is pressed before continuing. Machine code users might note to note that the key pressed is held in the A register. Z80 users CMAA, execode 80-00 can be used to check for a certain key.

LINES 2110-2150 read the joystick and PUT your lights. This is done with 600C 4e-4f02 which stores the physical values in locations 349-349. Reading them this way is quicker than using the JS0-JS3 commands. The fire button is checked for using (PEEK 102680) AND 11 as each

joy stick has test values for the fire button. Using this allows the need for IP PEEK (55268) = 128-DR PEEK (55268) = 254 THEN

This method is shorter, quicker and easier keyboard control to be more easily augmented by modifying the memory locations used with these given later in the program.

LINES 2260 and 2240-2260 make an effective explosion by drawing concentric circles gradually getting bigger first in the foreground colour and then in the background colour to blank a cell again. The Dragon's circles move outwards past when drawn over and these points make the objects look like little explosions.

LINES 2440-2480 are the PALETTE and RETURNP lines. The routines may be typed into your own programs to add the features normally found on professionally written games. The routines must be called once a load in a program.

LINES 2610-routines for weapons such as Y VERS YCAT etc in answer to a program.

To use the keyboard for control, follow the directions given in lines 2620-2700.

For those who write machine code programs I include To make it all off, a listing of a basic program that will assemble and write in machine code. It has the advantage of being small and easy to use. Also it will reset the program if the RESET button is pressed.

To Auto-EXEC Machine Code programs use:

18 CLOADM your program  
29 POKA=4000-PEEK(1271)  
POKA=1160 POKA=150  
38 POKA=1000-1000  
48 DESIGN LOADING SCREEN  
58 CLAVIM your program BH18  
PEEK(1289)-PEEK(1271)-1-10  
68 POKA=10-1000,1000 POKA=1000  
BH05 POKA=10-1000

If you do not want to CLOAD your program until line 18 and replace the PEEK(1289)-PEEK(1271)-1-10 with 500 the last address in your program.

To reset your program type CLOADM and press the enter key. The loading screen that you selected in line 48 will be displayed during loading. Loading takes about two minutes longer than usual but auto-EXEC on loading and if POKA=1 is pressed, that is the method only works with machine code programs.

For those who do not wish like typing in the game a password is available for £3.00 (cheques or P.O.) from Gareth Penfold, 208, Sutton Lodge Drive, Southgate, London N14 4PS.

```

10 GOSUB 1000 'TITLE
20 GOSUB 2000 'SETUP
30 GOSUB 1030 'SELECT THRETT
40 FOR PY=0 TO 130 STEP 4-GL
50 PLAY "V3311B,T175,B4;FD4"
60 GOSUB 2440 'PAUSE AND RETURN
70 GOSUB 2000 'MOVE BOMB
80 GOSUB 2090 'MOVE YOU
90 GOSUB 1970 'MOVE ENEMY FIGHTER
100 GOSUB 2170 'FIRE YOUR LAZER
110 GOSUB 2220 'INCREASE LEVEL
120 IF YOUTHIT THEN GOSUB 2220 'EXPLODE
130 IF FINISHED THEN 2510 'END
140 IF THRETT THEN 30 'NEW BOMB
150 NEXT PY
160 GOSUB 2330 'EXPLODE BOMB
170 IF NOT FINISHED THEN 30
180 GOSUB 2510 'END
190 -
200 -
210 -
1000 POKEA$H44,0
1010 CLS
1020 FOR A=1024 TO 1030:POKEA,42:NEXT
1030 FOR A=1056 TO 1058 STEP 32:POKEA,42:NEXT
1040 FOR A=1068 TO 1070 STEP 32:POKE A,42:NEXT
1050 FOR A=1504 TO 1535:POKEA,42:NEXT
1060 PRINT#34,"*****";
1070 PRINT#34,"*****";
1080 PRINT#34,"*****";
1090 PRINT#34,"*****";
1100 PRINT#34,"*****";
1110 PRINT#34,"*****";
1120 PRINT#34,"*****";
1130 PRINT#34,"*****";
1140 PRINT#34,"*****";
1150 PRINT#34,10,"WHICH SKILL LEVEL (1 TO 6)?";GL$=INPUT$;IF GL<1 OR GL>6 THEN 1150
1160 GL=VAL(GL$)
1170 IF GL>6 OR GL<1 THEN 1150
1180 GL=6-GL
1190 PRINT#34,3+1,"CAN YOU USE DOUBLE SPEED LYNN?";
1200 D$=PEEK(1125):IF D$<0 AND GL>2 THEN 1170
1210 PRINT#34,7,"*****";
1220 RETURN
1230 -
1240 'var ables
1250 DIM US(59)
1260 DIM ES(50)
1270 DIM BB(200)
1280 BP=40
1290 H=1
1300 PH0E4,1,PCLE
1310
1320 define enemy fighter
1330 DATA 0000000000001111100000
1340 DATA 0000000000111111100000
1350 DATA 0000000011111111111100
1360 DATA 0001111111111111111110
1370 DATA 1111111111111111111111

```

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# The Joyful Dragon

The mysteries of joystick operation explained by Pam D'Arcy

A JOYSTICK provides two values for a Dragon programmer to use in whatever manner he or she chooses. These are a value relating to a horizontal X axis and one relating to a vertical or Y axis. Both values are in the range 0-63. If like myself, you have an old Dragon manual, ignore the 'JOYSTICK interface' and skip the following.

The joystick values are placed by the BASIC interpreter in four global variable locations. Use of the JOYSTICK function gives the appropriate value from BASIC workspace into your variable, see Table One.

There is a routine in ROM (at address \$0012) that updates these locations. It is only entered from a BASIC program when \$20H is held for \$0001-\$0002 or used. This applies even if you are only using the left joystick or you are only interested in vertical axes. It is rather like the keyboard and its not user selectable — if the joystick readings were updated on every JOYSTICK command or even more frequently, the action may never be taken for long enough to determine the meaning of the joystick movement to your program.

## TYPES OF JOYSTICK

ANALOGUE OR BOUNER-BALL? OR TRACKER-BALL are the ones able to give you theoretically all possible values 0-63 in both directions. They theoretically

haven't seen my more scientific tests. Hold the pole of a joystick over Polaroid film and they may very slightly move between positions produced by one manufacturer, perhaps 00 being side to side (the full range of signals to the Dragon). Basically whenever you have your joystick physically rotated by the JOYSTICK command anticipate the loss for both joystick ports (although the values will be meaningless where no joystick is plugged in). Some advancements may include the words Linear Potentiometer. This is the basis on which one would expect analogue joysticks to work — the movement of the joystick in a few given regular increments determines the value on the stick. Progressions along that line. One would expect the following readings (Table Two) from an analogue of ball type joysticks (like latter day having a large sort of ball bearing in a socket that you roll around with the palm of your hand). STANDARD JOYSTICKS determine readings by a number of switches contained within them activated by moving a stick. The number of these 'able' values is determined by the number of switches alone, often eight plus centre.

Assume how about a 16 position box of buttons connected through the switch port but with a small testbed program we could use as a basis for hard and precise input of raw data?

SELF-CENTRING JOYSTICKS have no effect on readings apart from giving the user a guaranteed home (000) return to the centre point (00 00) on releasing the stick as it springs back to its home position.

## USING JOYSTICKS IN PROGRAMS

The use that you put the readings to is entirely a matter for you. I recall that in a previous Dragon User article someone suggested that unfortunately, a lot of the sensitivity of joysticks is programmed out of them. Using half-decent analogue non-self-centring joysticks, I find that the required control can be too sensitive particularly where a return to centre is demanded before allowing a change of direction or between prolonged movements. This can be trying to address, particularly the young ones in so called educational programs — some plain give up in despair because they cannot understand the mechanics as they move the stick in the right direction — but the program doesn't respond. I feel that less sensitivity about the centre point could be a distinct plus at such software! I hope you now realise why sometimes advertisements for selected joysticks claim they work with most games — it's a game as dependent upon a valuation of values that cannot be returned!

## JOYSTICK DEMONSTRATION PROGRAM

I knocked up this program really as a quick demonstration of using joysticks in machine code. However, it has proved to be an invaluable quality tester of our joysticks — revealing a weakness along three particular axes that we hadn't previously noticed, which is why I suddenly realised that it could be invaluable to you to take it with you to check out potential joystick purchases! The stick has been played with a fair bit here (mainly trying to point the entire screen blue — quite a strain on joystick control!) — good job the joystick isn't as though as the keyboard!

When I drew up to relate each reading that it gets back for the right-hand joystick to the graphics screen, as discussed above, analogue joystick readings are 0-63 in both directions.

The screen is 256 pixel columns horizontally by 192 pixel rows vertically. If each possible analogue joystick reading contains a block of pixels to eventually fill the screen, each possible different reading represents a four (256x16) column by three

Table 1

	000	001	010
JOYSTICK(0) Right joystick, horizontal	348	154	154
JOYSTICK(1) Right joystick, vertical	347	150	150
JOYSTICK(2) Left joystick, horizontal	348	150	150
JOYSTICK(3) Left joystick, vertical	349	150	150

Table 2

(A)	Y Axis	(B)	
	0	Joystick	0
0	0	(A)	0
1	0	(B)	0
2	0	(C)	0
3	0	(D)	0
4	0	(E)	0
5	0	(F)	0
6	0	(G)	0
7	0	(H)	0
8	0	(I)	0
9	0	(J)	0
10	0	(K)	0
11	0	(L)	0
12	0	(M)	0
13	0	(N)	0
14	0	(O)	0
15	0	(P)	0
16	0	(Q)	0
17	0	(R)	0
18	0	(S)	0
19	0	(T)	0
20	0	(U)	0
21	0	(V)	0
22	0	(W)	0
23	0	(X)	0
24	0	(Y)	0
25	0	(Z)	0
26	0	(AA)	0
27	0	(BB)	0
28	0	(CC)	0
29	0	(DD)	0
30	0	(EE)	0
31	0	(FF)	0
32	0	(GG)	0
33	0	(HH)	0
34	0	(II)	0
35	0	(JJ)	0
36	0	(KK)	0
37	0	(LL)	0
38	0	(MM)	0
39	0	(NN)	0
40	0	(OO)	0
41	0	(PP)	0
42	0	(QQ)	0
43	0	(RR)	0
44	0	(SS)	0
45	0	(TT)	0
46	0	(UU)	0
47	0	(VV)	0
48	0	(WW)	0
49	0	(XX)	0
50	0	(YY)	0
51	0	(ZZ)	0
52	0	(AA)	0
53	0	(BB)	0
54	0	(CC)	0
55	0	(DD)	0
56	0	(EE)	0
57	0	(FF)	0
58	0	(GG)	0
59	0	(HH)	0
60	0	(II)	0
61	0	(JJ)	0
62	0	(KK)	0
63	0	(LL)	0
64	0	(MM)	0
65	0	(NN)	0
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67	0	(PP)	0
68	0	(QQ)	0
69	0	(RR)	0
70	0	(SS)	0
71	0	(TT)	0
72	0	(UU)	0
73	0	(VV)	0
74	0	(WW)	0
75	0	(XX)	0
76	0	(YY)	0
77	0	(ZZ)	0
78	0	(AA)	0
79	0	(BB)	0
80	0	(CC)	0
81	0	(DD)	0
82	0	(EE)	0
83	0	(FF)	0
84	0	(GG)	0
85	0	(HH)	0
86	0	(II)	0
87	0	(JJ)	0
88	0	(KK)	0
89	0	(LL)	0
90	0	(MM)	0
91	0	(NN)	0
92	0	(OO)	0
93	0	(PP)	0
94	0	(QQ)	0
95	0	(RR)	0
96	0	(SS)	0
97	0	(TT)	0
98	0	(UU)	0
99	0	(VV)	0
100	0	(WW)	0
101	0	(XX)	0
102	0	(YY)	0
103	0	(ZZ)	0
104	0	(AA)	0
105	0	(BB)	0
106	0	(CC)	0
107	0	(DD)	0
108	0	(EE)	0
109	0	(FF)	0
110	0	(GG)	0
111	0	(HH)	0
112	0	(II)	0
113	0	(JJ)	0
114	0	(KK)	0
115	0	(LL)	0
116	0	(MM)	0
117	0	(NN)	0
118	0	(OO)	0
119	0	(PP)	0
120	0	(QQ)	0
121	0	(RR)	0
122	0	(SS)	0
123	0	(TT)	0
124	0	(UU)	0
125	0	(VV)	0
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127	0	(XX)	0
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129	0	(ZZ)	0
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133	0	(DD)	0
134	0	(EE)	0
135	0	(FF)	0
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141	0	(LL)	0
142	0	(MM)	0
143	0	(NN)	0
144	0	(OO)	0
145	0	(PP)	0
146	0	(QQ)	0
147	0	(RR)	0
148	0	(SS)	0
149	0	(TT)	0
150	0	(UU)	0
151	0	(VV)	0
152	0	(WW)	0
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154	0	(YY)	0
155	0	(ZZ)	0
156	0	(AA)	0
157	0	(BB)	0
158	0	(CC)	0
159	0	(DD)	0
160	0	(EE)	0
161	0	(FF)	0
162	0	(GG)	0
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164	0	(II)	0
165	0	(JJ)	0
166	0	(KK)	0
167	0	(LL)	0
168	0	(MM)	0
169	0	(NN)	0
170	0	(OO)	0
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172	0	(QQ)	0
173	0	(RR)	0
174	0	(SS)	0
175	0	(TT)	0
176	0	(UU)	0
177	0	(VV)	0
178	0	(WW)	0
179	0	(XX)	0
180	0	(YY)	0
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182	0	(AA)	0
183	0	(BB)	0
184	0	(CC)	0
185	0	(DD)	0
186	0	(EE)	0
187	0	(FF)	0
188	0	(GG)	0
189	0	(HH)	0
190	0	(II)	0
191	0	(JJ)	0
192	0	(KK)	0
193	0	(LL)	0
194	0	(MM)	0
195	0	(NN)	0
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198	0	(QQ)	0
199	0	(RR)	0
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203	0	(VV)	0
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210	0	(CC)	0
211	0	(DD)	0
212	0	(EE)	0
213	0	(FF)	0
214	0	(GG)	0
215	0	(HH)	0
216	0	(II)	0
217	0	(JJ)	0
218	0	(KK)	0
219	0	(LL)	0
220	0	(MM)	0
221	0	(NN)	0
222	0	(OO)	0
223	0	(PP)	0
224	0	(QQ)	0
225	0	(RR)	0
226	0	(SS)	0
227	0	(TT)	0
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229	0	(VV)	0
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254	0	(UU)	0
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291	0	(FF)	0
292	0	(GG)	0
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295	0	(JJ)	0
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308	0	(WW)	0
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310	0	(YY)	0
311	0	(ZZ)	0
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313	0	(BB)	0
314	0	(CC)	0
315	0	(DD)	0
316	0	(EE)	0
317	0	(FF)	0
318	0	(GG)	0
319	0	(HH)	0
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321	0	(JJ)	0
322	0	(KK)	0
323	0	(LL)	0
324	0	(MM)	0
325	0	(NN)	0
326	0	(OO)	0
327	0	(PP)	0
328	0	(QQ)	0
329	0	(RR)	0
330	0	(SS)	0
331	0	(TT)	0
332	0	(UU)	0
333	0	(VV)	0
334	0	(WW)	0
335	0	(XX)	0
336	0	(YY)	0
3			

(160x16) new blocks of pixels on the screen which are then coloured blue. The machine code part of the prog arc loops round updating the readings (BPR8010), checking the movement of the right hand joystick on the screen, and the FIRE button is pressed. It then exits back to the BASIC part of the program and the graphics screen sits there until S(Shift) or Q(Quit) is pressed.

If using standard type graphics, only the blocks for the variable number of different reading switch positions plus centre will be given. At this time you the number of possible line positions available in the joystick if it is not stated on the pack).

The BASIC program (Listing 1 - JD95A TECO) is pretty self explanatory. When RUN after setting up the machine code routine the PRACTICE screen is cleared to green showing a happens. When S is pressed it clears to yellow and shows the machine code. The machine code uses the path of the joystick in blue and the FIRE button is pressed.

**Listing 1**

```

10 REM JD95STICK PROGRAM 1C) PAM BY ANCY
20 CLR=0288,32888
30 CLS:PRINT"LOADING MACHINE CODE"
40 FOR PC=32888 TO 32882
50 READ BH
60 CSUB=CSHIFTVAL(16#)+D81
70 POKE HC,VAL(16#)+D81
80 NEXT HC
90 IF CSUB>#F27 THEN PRINT"ERROR IN DATA STATEMENT":END
100 DATA 34,74,B0,B8,12,18,7E,B4
110 DATA B4,B1,58,B8,B1,5B,BB,B1
120 DATA BB,C8,3B,3D,31,A8,B8,B1
130 DATA B8,46,31,46,C8,F8,B8,B1
140 DATA B4,B1,5A,27,62,C8,2F,1F
150 DATA 98,C8,AA,34,B8,43,1F,B9
160 DATA A4,AA,AB,E4,A7,A4,1F,98
170 DATA A4,AB,2B,AA,E4,A7,A8,2B
180 DATA 1F,9B,A4,AB,4B,AA,B8,A7
190 DATA AB,4B,B8,B1,B4,FF,2B,2B,B1,3B,FA
200 POLEM4
210 HCODE=32888
220 PRGDE=1
230 PCL=1
240 SCREEN1,0
250 KEE=INKEY$:IF KEE="" THEN 250
260 IF KEE="S" THEN POLES:EXEC HCODE:BDT250
270 IF KEE="Q" THEN 250
280 CLS:END

```

**Listing 2**

Line	Address	Code	Comment	Line	Address	Code	Comment	Line	Address	Code	Comment
1000	0000	000000		1000	0000	000000		1000	0000	000000	
1001	0001	000000		1001	0001	000000		1001	0001	000000	
1002	0002	000000		1002	0002	000000		1002	0002	000000	
1003	0003	000000		1003	0003	000000		1003	0003	000000	
1004	0004	000000		1004	0004	000000		1004	0004	000000	
1005	0005	000000		1005	0005	000000		1005	0005	000000	
1006	0006	000000		1006	0006	000000		1006	0006	000000	
1007	0007	000000		1007	0007	000000		1007	0007	000000	
1008	0008	000000		1008	0008	000000		1008	0008	000000	
1009	0009	000000		1009	0009	000000		1009	0009	000000	
1010	0010	000000		1010	0010	000000		1010	0010	000000	
1011	0011	000000		1011	0011	000000		1011	0011	000000	
1012	0012	000000		1012	0012	000000		1012	0012	000000	
1013	0013	000000		1013	0013	000000		1013	0013	000000	
1014	0014	000000		1014	0014	000000		1014	0014	000000	
1015	0015	000000		1015	0015	000000		1015	0015	000000	
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1075	0075	000000		1075	0075	000000		1075	0075	000000	
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1078	0078	000000		1078	0078	000000		1078	0078	000000	
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1080	0080	000000		1080	0080	000000		1080	0080	000000	
1081	0081	000000		1081	0081	000000		1081	0081	000000	
1082	0082	000000		1082	0082	000000		1082	0082	000000	
1083	0083	000000		1083	0083	000000		1083	0083	000000	
1084	0084	000000		1084	0084	000000		1084	0084	000000	
1085	0085	000000		1085	0085	000000		1085	0085	000000	
1086	0086	000000		1086	0086	000000		1086	0086	000000	
1087	0087	000000		1087	0087	000000		1087	0087	000000	
1088	0088	000000		1088	0088	000000		1088	0088	000000	
1089	0089	000000		1089	0089	000000		1089	0089	000000	
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1096	0096	000000		1096	0096	000000		1096	0096	000000	
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1105	0105	000000		1105	0105	000000		1105	0105	000000	
1106	0106	000000		1106	0106	000000		1106	0106	000000	
1107	0107	000000		1107	0107	000000		1107</td			



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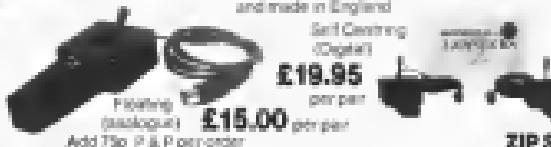
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# Dragon Logic

True or False — Logic on the Dragon explained by John Boyes

The XOR in which the Dragon's Basic interpreter deals with comparisons as part of IF statements is very interesting and more importantly can tell us the programmer open up some new programming techniques. Most Dragon users will be aware of the logical operators AND and OR when applied to compound IF statements, e.g. IF A = 1 AND B = 0 OR C = 0 THEN ...

But very few will be aware that these logical operators can also be used in a similar way to  $=$ ,  $<$ ,  $>$ ,  $\leq$  and  $\geq$ .

To understand how this is done and where the significance of it is we must first explore the way in which the Dragon deals with such entries as TRUE or FALSE.

In the above example the Dragon would first look at the expression A = 1 and decide from the current value of A whether in fact the expression is TRUE or FALSE (ie whether A is indeed equal to 0 or not). If TRUE the expression is given the value +1 and if FALSE it is given the value 0.

The reason that -1 is used to denote FALSE is that it represents every binary bit set in the integer that represents the logic value.

For example, if 8-bit bytes were used to represent integer values then the highest value it could return would be 11111111.

Now as numbers are represented in their complement arithmetic, the most significant bit is treated as a sign bit, a binary 1 indicating a positive number and a binary 0 indicating a negative number. It is seen to add one to 11111111 we would obtain the result 00000000 because the 1 would be carried right through to bit 17. In view of the fact that we are dealing with 16 bit numbers, this 1 will roll off the end into the carry register leaving us with the result zero. Therefore 11111111 represents one less than zero which is -1.

Getting back to our example, the second thing the Dragon would evaluate is the truth or otherwise of the expression B = 0. The next step would be to AND the two logical results of the expressions. So far the Dragon looks at each bit of one result and compares it with the corresponding bit of the other and if both bits are set it retains the corresponding bit set in the final result word. This means that if both results return TRUE as -1, the AND of all the two results would also be TRUE but if either were FALSE then the final result would also be FALSE. The final step would be to evaluate the expression C = 0 and XOR the C = 0 with the result with the value already obtained from A = 1 AND B = 0. The OR operation is accomplished by comparing each bit of the two logical values but unlike the AND a sign bit is retained if the appropriate bit in either word is set to one.

Having done all this the Dragon is left with a logical result which is either TRUE (+1) or FALSE (0) and we then have it knows whether it needs to carry out the action part of the IF statement. In actual fact the expression in an IF statement can be a simple variable and the "expression" will be considered to be TRUE if the value of that variable is NOT zero. So for example,

IF A THEN PRINT. The statement is true is perfectly acceptable to Dragon Basic and will cause the string to be printed for every case of A except when A = 0. This is perhaps a particularly useful for checking postal codes, as follows:

IF NOT POSTALCODE AND 3 THEN PRINT "A Postcode?"

The advantage of this method is that it automatically accounts for whether the value of the POSTALCODE has the most significant bit set or not and is thus much easier to program than the method given in the Dragon manual.

In the above example the Dragon performed an AND operation, the result of peaking location 65536 and the number 1 or 0 as appropriate. That means that it does the same thing with ordinary numbers. It did with the values given to 100000 (-1) and FALSE (0). For example if we entered PRINT 3 AND 0 the answer returned would be 1. To understand how this works the numbers should be converted to their binary form. 0 is 0000000000000000 and 5 would become 0101 when expressed as 4 bit words or 0000. If we look at these binary numbers we note that the only bit which is set in both is the least significant bit which represents the value 1 and hence this is the value returned for the expression 3 AND 0. We took the same numbers as above and applied the OR operator we would obtain the answer 7 or 0111 because each bit is set if either or both of the corresponding bits in the two given numbers are set.

Logical conditions as shown above are treated as integers (whole numbers) in the range -32768 to +32768. The reason for this is that the Dragon can only perform logic operations on integers so no Boolean logic (which is long winded even there it considers the most significant bit to be the sign bit) The significance of this is perhaps best explained by considering the NOT operator. The NOT operator returns the value which is given by changing all the ones for zeros and all the zeros for ones that is also referred to as taking the complement of the number. For example TRUE is represented by +1 or in binary 1111111111111111. If we NOT -1 we change all the ones for zeros and the result

would become zero which we know represents FALSE. This is of course what we would have expected because AND FALSE must mean FALSE.

Life gets a little more complicated when we ask the Dragon to work out NOT 0. As we saw earlier in 4 bit binary 0 would be 0101. When we take the complement of this number and replace the ones with zeros and the zeros by ones we get 1010. In practice this is just the least significant part of a sixteen-bit word and when we invert it (that is the most significant bits become zero) if we want to add 8 to binary 0110 then the result we would obtain the answer zero with a one carried right through to the 17th bit and hence ignored. The result we obtained for NOT 0 therefore was six less than proper -6. This was effected by the NOT function on a decimal number as to change the sign of that number and subtract one from it.

There is another logical operator, the XOR or exclusive OR (sometimes written EOR) but this is not directly implemented on the Dragon. To understand why it is not needed to look at the truth tables of AND, OR and XOR for two variables A and B. (Note that truth tables for 4 bit represent TRUE not -1 like the Dragon)

A	B	AND	A OR B	OR	A XOR
0	0	0	0	0	0
0	1	0	1	1	1
1	0	0	1	1	1
1	1	1	1	1	0

From the truth tables it will be seen that the OR function replaces the AND function by default when A and B are both ones, but the inclusive OR is a special case of the OR function which includes the implied AND. As an example take 3 XOR 5. As binary nipples these numbers are 0011 and 0101 and the normal OR operator would result in 0111 or 7. However, the least significant bit in both numbers is set to one as because this condition would also satisfy the AND operator. It is excluded and the result becomes 0110 or 6. One way to obtain the AND operator on the Dragon is to use an expression like OR OR 0 AND NOT [A AND [B]]. This is also cumbersome so instead one would use

[A OR 0] = [A AND 00]. If the OR is TRUE and the AND is FALSE then the result would be -1 minus 0 which is -1 or TRUE as we would expect, but if the AND is also TRUE we would get a -1 minus -1 which evaluates to zero or in logic FALSE.

The relation where the OR is FALSE and the AND is TRUE is logically impossible — that about it! Thus the minus sign is a useful shorthand and easy to obtain the logical expression AND NOT.

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71

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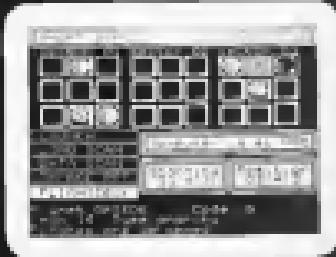
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## Magic Mazes

**Program:** The Second and the  
Unknown. **Bally Software.**  
Cherryways House, Lutterworth Road, Bally, Lancashire.  
**Price:** £3.99.

WHEN a few years ago I started playing Dungeons and Dragons I was sure that it was an experience that would make a great computer game. But as I progressed further and further into the game I realised it should be practically impossible to write unless it was reduced to simple terms such as combat like humans and tell the monsters.

Hoping reached this conclusion I dropped all desire to write such a game until I thought that I could have very little difficulty to hold the player's interest.

Bally Bally Software appears to have designed with me in mind and has produced this rather simple game. The idea of the game is to wander around the maze (still location) collecting the three pieces of the key and then finding the locked door and escaping to hinder your progression. In this case there is no mystery, just a straight-forward adventure setting at the various rooms.

The screen displays a single screen 1, and is very well done. A small triangle the left of the screen shows the view ahead of you complete with monsters, weapons and whatever else happens to be in the rooms to look.

Two smaller frames to the right above your attack and defence weapons as icons and beneath these frames there is a list of the available options (the game is played entirely by single key choice from this) — good move for those who have trouble writing out the appropriate words in an adventure). A very less description of the location in the rooms (such as There is a Unicorn here) is printed underneath the room name (no pun intended) together with details of your strength when appropriate and other bits of options.

Movement is via the arrow keys and leaves the display very confused if you let

arrow is pressed, the player will turn to the left and then move one space but if there is no door on the left and the player will neither move nor turn. Get it? As you can imagine this makes moving a necessity, but even so is extremely difficult.

As you play at a different point in the maze every game using old maps becomes more trouble than making a new one! This is all very lame.

The major fault with the game though is that it is very boring. There is no real strategy and map selection is no option as is necessary — among one of the most satisfying parts of playing role playing games.

This program seems an interesting similarity to Gert Brönn's It's pretty and well-written but has no sustained challenge. However it is an introduction to D & D for the uninitiated. It may fill a gap!

Jason O'Connor



## In the dark

**Software:** The Dark Pit. **Micro-It.** **Travis Reed, St Austell, Cornwall.**  
**Price:** £3.99.

A CONVERSATION from the "Tandy The Computer" in issue 10 with the Tandy (C64) disk plugged into the left joystick port should give you some idea of what's in store. Playing this is common or garden stick-and-ball surface. The game itself is on the Holy familiar roads like lines of Pookashire or Monstrous GL and Cromerdown (not the Lands of Havoc).

It will come as a surprise to no one that the aim of the game is to escape from the dark pit itself thus comprising a number of linked rooms each containing up to four quarters of the screen area with exits round the per-

imeters to other rooms! The joystick controls the mischievous little man who runs quite gamely around dodging the equally inevitable monsters and not letting anything he can lay his hands on. These objects are shown at the top of the screen and can be brought into play by pressing the fire keys. His items being his keys of which a shield etc. and then his power pieces to open doors.

Also lying around are red coins and blue keys, and amazingly enough these open doors of a reaching radius giving you access to new areas of the maze and as you collect objects gradually your score increases. There are several keys of each colour and you can accumulate these and use them one at a time to recollect.

Playing the game involves moving the man round the walls and barriers on each occasion avoiding the patrolling monsters and trying to reach as many of the scattered goodies as you can.

Most of the monsters move in regular patterns and as there's plenty of bobbing and weaving and searching goes on but there's also an element of Mario Bros type strategy in working out how you reach the objects and keys. Other monsters will insist on mousing things up by breaking your persistence.

As such the game is smoothly done and quite fun to play but it's either old hat and messy objectives or results of other games we've all seen before going back to basics.

It will have to be said that the collision detection is appalling and it's far too easy to lose in the vast spaces between you and a monster.

The screens get tougher as you go with plenty of variety in them so if you buy it you'll probably get your money's worth playing it but it's nothing to get really excited about.

Mike Gerrard

## Music Micro!

**Program:** Music Master. **Guitar Key Software.** **Indusoft Products, Dunstable.**  
**Price:** £5.99 (copy); £9.99 (boxed).

MUSIC MASTER is a utility designed to help you write and edit a tune displayed on screen in standard musical notation. All options are selected from the keyboard, and software uses 34 possible functions, things and certain confusing to start with.

This is not helped by the manual which contains numerous pointing arrows in the table that tells you which keys to press to play each tone.

After a little experimentation the key layout becomes familiar, and entering a tune becomes a lot easier. It is clear that the performance of the program is excellent.

For a start the program uses the play command and so only one note can be played at a time. This seriously limits the usefulness of the program — it does not have much educational value, and besides it does not expand like Dragonsoft's music potential at all for the programme.

For the musician, several things about this program make it irritating to use.

Fretly or sharp or flat symbols that rise or lower the pitch of a note are displayed on the screen but these cannot be displayed and there is no facility to change the note to a particular — a feature that might have made this program worthwhile.

To give the author his due that program is very professional and it does every thing the manual says it does but it is a pity that a little more thought had not gone into the program at the design stage.

David Pennington





# MIKE GERRARD'S ADVENTURE TRAIL

WEIGHTS WOULD we live without Scott Adams? In looking at his series of adventures, all centered for the Oregon fan recently, I've come to realize Scott's adventures which don't start from the ground up are designed to be of an advanced level of difficulty though I wouldn't let that put anyone off the maze-opening screen enough to get you off before you're started though, and it when someone could think it would take a little trouble to tidy it up. It needs no tobacco. I am in a 3D setting room. Within there large tape recorder. Scott's adventure starts on road telephone to Adventure Register & Second Mission by Scott Adams. Dedicated to Morgan Adams. A minute ago someone ran out of this room? By the way, I seem to be carrying something. What shall I do? My answer is that you get the info and directions at the beginning, not halfway through your first location and it might also help if the passenger never agreed that auto drivers are number three instead of calling a number four. Me picking? Well, if it's needed just me in an adventure for relaxation and it looks like that claim seems apart but so I don't see why Scott Adams should get away with it!

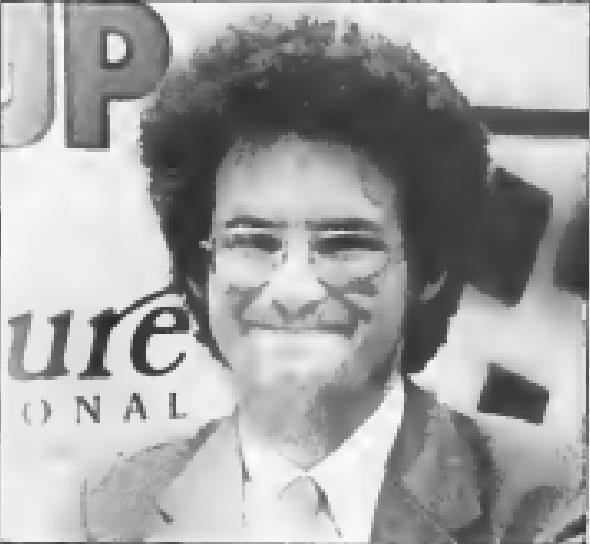
Indirectly there's not much of a story to go on, but if you listen to the tape recorder you learn that you're in a isolated reactor plant and that's substrate is released. Armed with a time bomb the subscriber is prepared to set himself on fire to destroy the plant and give to whose political to stop him? God is in case. Avoiding his messages that get lost on tape recorder, isn't it? You're also told that you find security keys and a map in the man's envelope besides that he's recorder, but after a frustrating time trying GET ENVELOPE GET MANA GET MANA ENVELOPE MOVE RECORDING and I eventually realized that the envelope never have been locked but I figure that can't be of the room a minute ago. In which case why didn't he take the interesting tape recorder too, which the tape locker if you were of lying around? Perhaps you discussed both in time so well give him the benefit of the doubt on this one, but credibility is not this adventure's strongest point. Considering that you're trying to save the plant from destruction, it's amazing how hard everyone i have made I had for you.

That's not to reason why the adventurer must die or die, and you're forced to do it by having a suddenly impounded bond collected on you (or yourself)

which the author is currently giving you, informing you that the bonds on sale. A little reparation leads to a free hearing combon and ticket price with nothing — with just a chance for an empty plastic bottle in a cardboard room. This object passes into insignificance, however when you reach the grey room and discover it has with suggested points of a chair which is attached to the floor. You're told that it seems quite safe and you're invited to sit down. No thank you! Well, not straight away, though you pretty soon discover that in fact this is your only option because you can either sit with a more imaginative use of a bucket than I could.

I won't tell you what happened in the chase though I will tell you that there seemed to be a slight bug in the program which would let the entire info commands once I recorded again only taking back each time with the response. Use no more than two words. I couldn't even DART but that didn't happen a second time so maybe it was just a glitch

. After a while you hear a thud somewhere in the building, and as you rush to investigate you fall over one bad substrate. He's definitely communicating with players. His speech is part of an angry envelope, an angry pit crew and noise, and as well as getting all these you'll even get the dead subscriber. Wandering around with a dead body hanging round your neck, you should be able to get through the whole place into a large white void to right, and while I don't want to give too much away I find the next little hurdle an even more remarkable part of the story. The subscriber had an identity card number which has to be inspected, but without the body you won't be able to proceed as the picture on the card doesn't match your own face. However, if you happen to have with you the dead subscriber then everything is fine as the face on the camcorder is the face on the dead body. Charming! Being pay, if the picture on the card is anything like those passport photos, the only hope it would resemble is a good one.



Scott Adams — real cool and keep

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From here the adventure hinges on getting a correct sequence of events and also working out the order in which you must press various coloured buttons in order for many things happen or stop them happening. How much I've seen I can't say. I wouldn't have thought this was notably harder than others but others where you sometimes even have difficulty starting but maybe it gets tougher. Certainly worth investigating, anyway, but not by other Adams' adventures first.

One of the difficulties, of course, is The Hulk and regular reader Philip Gledhill of 80 Jux Lane, Bognor Regis TR10 3BB is already collecting stars in this one but doesn't know where to use them. For that you **DANGER! P.D.Q!** Philip also says he's got three books high enough to reach something which I couldn't make out in his letter. If you can guess what it is and can help him contact Philip, whose email address is given at the bottom of this Adventures International section.

No doubt the ears of many readers will prick up when they hear that Hulk is available on *Syzygy*. Now (at least) it's available on *Syzygy*. Again (but not at 37 Caxton Close, Shirley, Chelmsford, Essex CM3 7DG). There must be something in the Hulk as that last Philip Gledhill has completed a vast number of adventures. His advice on *Syzygy* will have to be pointed towards us as a question, but because so many of you have written and ask how to tell the Death Knights apart I'll imagine you'll need. He says you have to increase the fury level. Then you can go back to the computer to release death knight for a practice battle but by ploughing in at the deep end and going for him straight away that managed to tell the Dark Lord at the first attempt. Just to prove it wasn't a fluke I though she went back and did it another few times. She warns that you haven't beaten the last of them however, but if anyone's really stuck at the final hurdle then send her a tape with a saved game on and she'll progress it through for you. Don't forget to

also send a jiffy bag with sufficient postage for Del to return the tape to you otherwise she has my express permission to ignore you so there.

Philip Doolley of Chelmsford starts his letter by saying that he's got a lot to answer to. What can the self as incorrect clue or reconstituting a cult adventure? No, it's just that about 12 months ago Philip was quite happy enough playing Donkey Kong, Chopper Egg and others, but then he started reading the adventure columns and thought he gave them a try. Since then I had lots of fun playing *Shambulance* nightshift and a cracked cash problem, not to mention *women* *Hobbit* in *Shambulance* and *Zen* (*Quetzal*). I've sorted out Philip's *women* *Hobbit* for him (but don't touch that *addiction*, I'm advised). Perhaps this column should just carry a government health warning that reading it can seriously damage your sanity.

This must be what a happened to David Hartnett of Bishopton, who wrote in to say Phil, playing *Snakes* with that well-known adventure, *The Cleopatra's Challenge* of Mayan Myths. David says he's managed to get the longitude and latitude from the computer game and he's made some progress with it but doesn't know what to do with the

answers or how to get rid of the town full of zombies. Hartnett has also found the prints of Mrs Thatcher by car (I hope the match is or sickness ticket). This column being politically neutral, I can't say whether he's on the right lines with this last one. But thanks to David for a letter which was certainly different and gave me quite a laugh.

Always end on a good note, they say, so for all of you whodowners written over the past few months to tell me you've even invented one of the infamous Colossal Quest Adventures (I expect the Dragon, apart from the disk version, from Computerpart, with good news could be on the way). A Macintosh-style version of *Snakes* is already available, has been produced by a company called Crown Software from Manchester using their own machine code adventure writing utility. As I mentioned this company's trying to sort one of the larger Dragon software houses worldwide if not, failing that then they hope it themselves, and hence a preliminary version of the game I'm sure it will appeal to lots of Dragon enthusiasts. I won't be reviewing it till I can tell you where you can buy it and for how much, but if you're at all interested in that there's only one thing to do, as usual — search this space!

## Adventure Contact

To help puzzled adventurers further, we are introducing an Adventure Helpfile — simply fill in the coupon below stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help:

**Adventure  
Problems**

**Name: \_\_\_\_\_  
Address: \_\_\_\_\_**

Line 1213 Little Newport Street, London WC1H 4YP. As soon as enough entries have arrived, we will start printing them in the magazine.

Don't worry — you'll still have *Adventure Trail* to write to as well!

June 86

# Adventure Contact

**Adventure: Perilous Daily**  
— London French Problem: How do you get to see someone in the bath? And where is the *Outer* *Island*? **Hunter**: Please. **Address:** 18 Tregowen Street, Liverpool, L14 9HT, Merseyside, L14 9TG, South Africa.

**Adventure: Return of the Ring Problem:** I am at Level 15 with 60000 experience and have completed all quests. I even have the Time Ring but what do I do next? **Help:** None. **Reader:** Richard. **Address:** Room 201, Agnes Weston, Abber Road, Didsbury, Greater Manchester, M20 4JL.

**Adventure: Return of the Ring Problem:** How do I get to the centre of the city of the start? I am

in the City of the Galaxy? **Name:** David Eggleston. **Address:** 5 Tithe Road, Chelmsford, Essex CM1 8AA.

**Adventure: Madness and the Monsters Problem:** How do I get through and out from the hot sheet please? **Name:** Marcus. **Address:** 11 Aldersleigh Drive, Wetherwood Station, ST17 4PR.

**Adventure: Return of the Ring Problem:** Walked on Forest Moon but can't do anything there's useful — **Help:** None. **David Hart:** **Address:** 16 Harlech Gardens, George Lane, Caversham, London, RG4 8QS.

**Adventure: Shambulance Problem:** How do you get out of the city of the start? I am

stumped. **Name:** Paul Houghton. **Address:** 5 The Park, Leeks, Heriot House, Stockport, Cheshire SK6 1QZ.

**Adventure: Manic Miner Problem:** Must Telephone Name Guy Hunter. **Address:** 38 Lynn Street, Bognor Regis, West Sussex.

**Adventure: Return of the Ring Problem:** In the House of Chaos in the Forest, who is stone? How do you get the key from the giant? **Name:** Mark Hayes. **Address:** 2 Burdon Close, Bedfont, London, TW11 1NY.

**Adventure: Mansion of Doom Problem:** How do I get across the deep pool of acid that blocks my path to the coffins?

**Name:** Ianous. **Address:** 47 Chats Drive, Highgate, Farnham, Surrey, GU10 5EX.

**Adventure: Return of the Ring Problem:** Where is the Treas' Urn? Can't find one will offer £100 on the guess. **Name:** Paul Bryant. **Address:** 1 Clemence Villas, Tamworth Road, Fazeley, Birmingham, B65 3UJ.

**Adventure: El Dorado Problem:** How do you tell the Eagle? What do you eat with the Moog Bush? **Name:** S. J. Gamble. **Address:** 29 Pleasant Avenue, Hodge Hill, Birmingham, B32 8HQ.

# **JOHN PENN**

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# Cheat Sheet!

HUANG QI SPENT many frustrated hours struggling to conceive the Powers of Darkness to be found in the Return of the Peng, here another illustration that may be of use to offset those negative Powers which

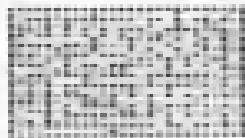
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Find the range of the Mayo Clinic. From all kinds of types the "true" patient being the same in each the location of the tuberculosis seems different. It would be

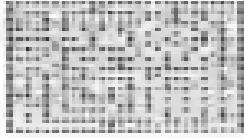
have not indicated all of the benefits to be gained in the Marketing Phase. It is felt that this would spoil the spirit of the party for the more advanced.

For the adventurer with little money (the "poor" program modeles the "Save" mode to maintain the player's status). Money (including the number of regenerations) has been deliberately curtailed, as anyone who tries to make rapid progress with its meager supply of credits, crystals, and food deviates in mind from the norm.

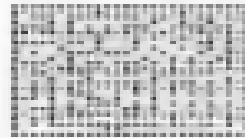
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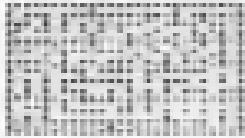
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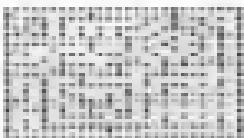
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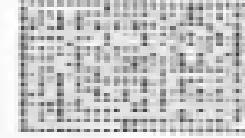
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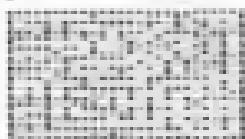
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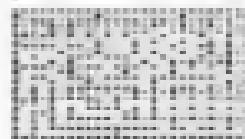
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# The Dragon means business

Brian Cadge examines a suite of professional business programs

THE ROLE of the Dragon in the UK market as far as general user concerned must now be clear. On one hand it is the Dragon as a source here it will be seen as a complete introductory system to professional software. This it seems is the view taken by London-based Computerware who are committed to the Dragon computer with the FLEDA and OS-9 Operating Systems.

Computerware are now marketing a complete set of small business packages to run under the OS-9 Operating System. The packages are in two volumes. Volume one contains Invoicing and Stock Recording and Volume two contains Sales Ledger, Purchase Ledger and Labeling.

All the programs are designed to make up an integrated set and some share common files (such as the Item File). The programs were originally coded in BASIC-9 which is also available for OS-9 and were marketed by Dragon Data. However almost certainly they were released Dragon Data with all the rest of history.

Each individual program of the package uses a separate disk making a total of five disks for the five volumes. Running any of the programs requires the OS-9 system disk to be booted and the BASIC-9 system disk to be inserted. This sets up the 30-column display and loads in the BASIC-9 OS-type package. Instructions are then displayed to change the system disk for the program disk (the particular program then executes).

An unfortunate feature of all this is that to change from one program to another (for example from the Sales Ledger program to the Invoicing program) the machine has to be turned on and off and the system reboots. It is not possible to swap program names from within the package, and even using the Overboard option which retains the OS-9 command prompt does not help as running the BASIC-9 programs tends to be unreliable. To be fair this is probably more the fault of OS-9 rather than the software and the same package running under FLEDA would not have such problems.

All of the programs are menu driven and use the menu-line approach to entering data. Sensibly all the programs use the same format and the first thing that greets you after a few seconds of disk latency is a main menu.

The first thing to be done with each package is the setting up of your company particulars. This program allows you to specify a company name, address, telephone number, VAT rate and so on, as well as allowing automated linking of other packages such as the Sales Ledger and Stock Recording system, for example the Invoicing system.

Finally the various programs in the

package allow you to do the following. The Stock Recording system allows transactions to be entered as either sales, returns, returns, returns or scrapped. Net transaction amounts and for receipts, its either purchases, returned requirements, or returned sales. Once the transaction is set up they can be changed at the individual record level or at the product group level. There are also quite sophisticated enquiry options. The transaction entry format is the same for all types and again is menu-driven.

The Stock Recording system offers a number of reporting facilities including stock listing and valuation, a listing of stock moving items as a reorder list and usage history of items. Simple transaction listings can also be produced by either item or transaction type. The reports are output to the printer. The system then allows selection of either single sheet feed (per item selected) or continuous feed (no last margin).

The purpose of the stock recording system is really to maintain quite sophisticated records of stock and to provide generally useful file enquiry and statistical options.

The Invoicing system allows the entering of all invoicing details. The Customer file can be copied across from the one used for Sales Ledger and Invoicing details can also automatically be linked to the Stock Recording and Sales Ledger programs. This is available on a single drive system but requires a fair amount of disk swapping as it takes much memory for the use of a double disk system.

The invoices can be as long as there is disk space and can contain any number of entries for each invoice but a particular customer again at entry stage has the facility approach with the use of dynamic editing. The item file is also maintained by the Invoicing system. This contains an item number, description, size, price and unit of measure (such as each or per foot) for each product of the company.

Printing invoices is quite straightforward. Following yet another on screen menu the user may select either plain or company headed paper, choose to print only those invoices previously unprinted and to start and finish at particular invoice numbers.

So much for volume one of the software volume two contains three disks — sales and purchase ledgers and labeling. The sales ledger programme based on a Financial Year of 12 periods, each either a calendar month or other period to suit the user. The programs use the OS-9 system date as the default, and also check read any other dates entered are reasonable compared to it.

Two files are used by the Sales Ledger

system — the Customer Account file and the Transaction file. The program allows the recording and audit of transactions made between the company and customers, as well as providing VAT information and the usual file interrogation facilities. A certain amount of cash control is also available through Debt Aging and Credit Lines.

Credit lines include the ability to set all overdue accounts accounts whose credit limit has been exceeded, as well as company ledger summaries and automatically balance analysis.

The Purchase Ledger system uses exactly the same approach as the Sales Ledger system. In addition each file analysis and report facilities are available. These logs are used by the system. These are the Supplier account, the Transaction file and the Analysis Code file. The last file contains details of the codes used within the system for analysing purchases. Some of the codes are preset to usual values such as 10 = rent, 40 = legal expenses, but all 100 codes can be changed by the user.

Finally the labeling system performs a fairly obvious task. The options when only one file, the Labeling Account has been data can also be taken from the Sales Ledger, Purchase Ledger and Invoicing Systems. Labels can be printed directly by selecting any or printed from the external Labeling Account file. The various parameters for the label types may be set up allowing different sizes of labels.

As a complete system, the package seems really suited to the small-to-medium-sized business. All interaction is via clear menus and pull-down menus use of files or the OS-9 on-screen display throughout. It is nice to see a package written specifically for the Dragon under OS-9. The big omission I have to make concerns the basic key. That is an easy to press and if you do you are met by an error message and the OS-9 prompt. This is also easy to get back to the package except it is related, and the files may have been left in an intermediate state. The need for regular backups is obvious. Having said that, the system performs excellently otherwise, if you can stand the rather long periods of disk activity between saving data, the programs are snapshot in and out. Again this is really the fault of OS-9 and not the package itself.

I have only scratches the surface of the facilities offered by the various programs. An in-depth look at each would simply be repeating the extensivity I had on minutes, and would serve little purpose.

This is a very professional package and really makes me very forward for the future of the Dragon 64 in the UK.

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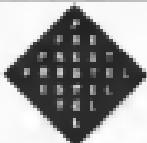
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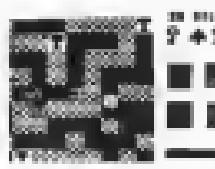
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# Dragon Answers

## Missing Memory

I HAVE purchased a disk Dragon computer and as I went thru the computer stages, only BASIC would run off the floppies. I get to the other stages (Romantic) I am in the process of developing sound hardware and would like to know which pins on the ROM board must be connected to P2-clock and VMA as on the 8008.

Mr. Mark Brooks  
Dr. Krasnow  
22 Single Reed  
Misty Ridge  
Mr. Sculptor  
Chestnut

THE ANSWER to your first question is simple, just type BASIC immediately after turning on. Although the ROMs are interfaced with all 8008 peripherals and to memory address compatibility, the pinouts of the two CPUs are not identical. The 8008's P2 connection (pin 27) is similar to the 8009's P2 connection (pin 24). The 8009's P24 (pin 26) connects to the "Memory Address" and goes high when the address bus is valid. There is no direct equivalence on the 8008 — the address bus is valid on the leading edge of the P1 gate during program steps and P1 is not the same as P27 on the 8009.



Following revisions will work:  
Cassette Connected

- 1) OPEN 1 -1, "BASIC"
- 2) OPEN 9 -1, "BASIC"
- 3) INPUT #1,A\$ A\$
- 4) LINE INPUT #1,A\$
- 5) PRINT #1,A\$,A\$
- 6) END #1
- 7) END#1
- 8) Connected to Subroutine
- 9) F10, "BASIC"
- 10) F10, "BASIC"
- 11) PEEK PAGE#1, A\$
- 12) FLIPUP PAGE#1
- 13) PEEK PAGE#1, A\$
- 14) END#1
- 15) END#1

## Man of Letters

I HAD wondering if you can help me in spectrum compatibility in respect of "The Dragon and OS-9".

The problem is that I would like to have a disk for the switchdisk utility but I find, even following all the instructions in the OS-9 guide I connect disks that are associated with Spindisk.

Greg Hansen  
St. Thomas Hospital  
London, ONT

THE SPINDISK.DSK program is certainly worth passing on a separate disk. The following procedure will produce a working Spindisk.

- 1) From the 800 disk use LOAD to load ROM8000.CPRT 8000.DSK
- 2) Format a blank disk
- 3) With the disks still in drive type ROM8000.CD1 Reformat by ROM8000.CPT
- 4) Create a file SPINDISK containing assembly language using the ROM8000.CPRT command
- 5) Load the Spindisk disk and copy the following CPRT 10000000.PWLL .000

## Disc Commands

I HAVE just purchased a Dragon Data disk drive and feel the compatibility needs a little work!

Can you tell me how to convert saving and loading data sources from tape to disk? I have tried using TAP2DISK, FILED, READ, and WRITE without success. My main use is with a standard cassette program and I want to save and load data in to the instead of tape.

John Smith  
Aylenbury  
Books

THE MOST common cause of problems in this area is the PRIVATE command. Under PRINT #1 it does not automatically terminate carriage returns and line feeds. For most programs this

isn't serious as the buffering graphics is full you are not experiencing the drawing and processing of the graphics to the Cathode Ray Tube of the TV.

If you move the graphics while the screen is not being drawn (using the "Wait" key back of the TV) then the program will not blitter. This is simple to achieve by adding the following two instructions before your routine to update the screen:

WAIT 10000000

END SUB

What this does is wait until lot 7 of location 577000 is high — this is the Video Sync interrupt flag and goes high when the CRT has finished drawing a screen and is ready again to repeat the screen.

## Hi-rise

IS THERE any way of loading a basic program (say a disassembler) stored in machine code (pac) form? I have tried POKING it in to C9 with a higher address but get CR when trying to start the basic, whilst reading POKES 25 and 26 with their original address leave the basic.

Unfortunately, I have discovered a bug in the 8008 and machine code in the machine. Typing a number is and number moves the cursor in characters along the line being edited.

Bruce Beatty  
Oakville

TO: 10000000

PAC

Process

Locate

TO: 10000000  
Program above  
a machine code program if any  
part you do the following:

One way BASIC statement is  
set up of BASIC (eg CLRM 200  
400000). Now load the required  
code of 40000000 upwards, then  
POKE 25 and 26 with the first  
two bytes available after your  
machine code. Type in OSLOAD  
Locations 27 and 28 will move to  
the right values.

The reason for the SYSTEM  
CMD0H on POK is that the first  
byte of BASIC must always be 0.  
Therefore you should use the  
first two bytes of BASIC and POK  
from 0.

However please note that if  
the program uses variables  
these variables will be stored at  
locations pointed to by 25 and  
26. If 25 and 26 point to just  
beyond your machine code  
program or any other storage  
area, the program may be over-  
written by the variables.

## Sprites

I HAVE been writing a game in machine code which uses sprites produced by using CALLS or  
LDH (OPCODE) but no  
matter how fast I update the  
characters they always seem to  
blister can you suggest why?

Phil Parker

This month we cover the control of basic variables (simple numbers and strings). This information will be of use mainly to the programmer who wishes to add new command-line options to BASIC.

## Variables Memory Map

Two FOLLOWING routines are used by BASIC for storing information regarding the state of numeric and string variables. It is not advisable to change the contents of these addresses from BASIC, although they may be FREEKed when useful.

- Variable Type Flag. Signifies the type of variable encountered. It is 0 for numeric and 255 for string.
- Start address of simple variable name in RAM. See below for an explanation of the format of this table.
- Start address of array table in RAM.
- End of storage in use. This points to the last byte being used by BASIC.
- Top of free string space. Note that by subtracting the contents of 30734 from this you can obtain the amount of free string space left and so prevent OS errors.
- One number of current Data statements.
- Address of next item in the current Data statements.
- Format variable list in use.
- VARPTR address of variable list in use.
- Floating Point Accumulator number list.
- Part of PPW used in assignment of 16-bit variables and strings.
- Floating Point Accumulator number list.

The VARPTR address of a variable points to the first bytes which hold the numeric value of that variable or points to the start address of a string. It is the same address returned by the BASIC VARPTR command.

The format of the variable table is as follows. Each variable entry takes 16 bytes of space bytes. The first byte is always the ASCII code of the first character of the variable name. The second byte is the ASCII code of the second character of the variable name, or zero if the name is only one character long. For defining variables the 2nd byte is set to hex 120 (added to it).

The next two bytes depend on whether the variable is a plain old number. Numeric variables are stored with their leading characters at the first byte followed by the value of the number. The most significant bit of the number is set if the value is negative. Put a string variable the first two bytes contains the length of the string (0-255) and the third and fourth point to the start address of the string, which may

be either in the program area (for characters) or in string space.

A simple way of adding commands to BASIC is to use the BASIC command followed by a number of parameters. If the address of the routine is stored in a variable, the variable can be called in a command word to control a specific part like *format* could be *FORMAT 10000 10000 10000*.

The logic part of the routine needs to call the *QDeoms* routine to stop the process after the routine's address and then from one of the routines used by normal basic commands to evaluate strings and numbers can be used on the parameters given.

## Firmware Routines for Variables

The following routines can be used for creating, destroying and clearing variables. All addresses are in decimal and are given for both the Dragon and Tandy machines.

**SetSpace** Dragon 34636 Tandy 45362 This routine will evaluate and put the following address of the expression which follows into location 65300.

**GetString** Dragon 34641 Tandy 45364 Creates a string and places it in some free string space. This routine should normally be followed by a call to *GetExp* to get the address of stored string.

**CKAddress** Dragon 35242 Tandy 45477 Posts in the next significant character on the command line, and checks that it is a colon. If it is not then a Syntax Error is produced, otherwise the routine simply returns.

**CKEndBrk** Dragon 35238 Tandy 45478 As for *CKComma* but checks for close bracket character.)

**CKOpenBrk** Dragon 35236 Tandy 45474 As for *CKComma* but checks for open bracket character.)

**CKChar** Dragon 35244 Tandy 45479 As for *CKOpenBrk* but checks for the character in the B register.

**GetVar** Dragon 35479 Tandy 45511 Gets the VARPTR address of the following variable name (not expression) and places it in locations 5714-5715. The variable type is placed in location 5716.

**GetVarP** Dragon 35629 Tandy 45527 Returns the value of the argument given in a ULR location as a 16 bit number in the D register.

**Assign-B-Var** Dragon 35614 Tandy 45533

Assigns the value in the B register to a numeric variable. This routine also returns to the basic processing logic and so should be entered at the end of a function routine or ULR routine using a JMS.

**Assign-D-Var** Dragon 35629 Tandy 45532

Assigns the value in the D register to a numeric variable. Every condition is otherwise as for Assign-B-Var.

**Assign-16-bit** Dragon 35630 Tandy 45530

An alternative routine to Assign-16-bit. This assigns the value in location 65300 to a variable. Every condition is otherwise as for Assign-16-bit.

**GarbageCollect** Dragon 35632 Tandy 45531

Forces a controlled garbage collection of string space. This routine can be called from basic (JMSD) or machine code to control when the passes about when using large volumes of string space.

**DelVar** Dragon 35633 Tandy 45532 Frees the space taken up by a variable. On entry the X register must point to the VARPTR of the variable to deleted.

**Get-16-bit** Dragon 35633 Tandy 45533 Returns the value of the following number in the D register. If the number evaluates to more than 16 bits then an FD error is produced.

**Get-16-bit2** Dragon 35643 Tandy 45535

Returns the value of the following number in the X register. If the number evaluates to more than 16 bits then an FD error is produced.

This is the 10th in Brian's series on the Dragon's ROM routines. Next month will be covering Firmware Vectors.

If you have missed any of the previous issues, they can be obtained from Dragon User, Beck House, 12-13 Little Newport Street, London WC2H 7PR, at £1.25 each inclusive of postage packing and administration charges.

Just to remind you of previous months:  
Sept 85 — Cassette Operating System  
Oct 85 — DOS Firmware Routines  
Nov 85 — Test Manager Routines  
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LAUNCH.PRG	10K	DATA	LAUNCH.SAV	10K	DATA
LAUNCH.SAV	10K	DATA	LAUNCH.ZIP	10K	DATA
LAUNCH.ZIP	10K	DATA	LAUNCH.ZIP	10K	DATA

All files require a copy of the BASIC monitor.

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## Competition Corner

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Postage is postage stamps only.

WITH JUST FEW HITS upon us, this is a short little utility and displays the calendar for any given month between the years 1800 and 2000. Simply input the year and month and let the computer do the rest. Readers with printers might like to design his program to print out the complete calendar for given dates soon.

The method on which this program is based is one that is found in a number of mathematical texts, and which calculates the day on which any given date falls. The method is as follows:

Take the last two digits of the year and add to it a quarter this value (disregarding any fractions). Then add the month value from the table below.

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2010-2011  
2011-2012  
2012-2013  
2013-2014  
2014-2015  
2015-2016  
2016-2017  
2017-2018  
2018-2019  
2019-2020  
2020-2021  
2021-2022

Now add the day of the month that you are interested in, and finally add the hours, minutes, and seconds.

**2000 — 2009** +1    **1762 — 1779** +4  
**1800 — 1899** +0    **1760 — 1752** +1  
**1800 — 1889** +2    **1660 — 1659** +3

When you have the total days by seven and note the remainder. They will tell you on which day of the week the date fall [1 = Saturday 2 = Monday 3 = Tuesday 4 = Wednesday 5 = Thursday 6 = Friday and 0 = Sunday].

In this table for the month values note that a different figure of 16 is used for the months of January and February for leap years only. A year is a leap year if it is exactly divisible by four. Unfortunately, this is not enough to fix the rule. The rules of the leap year were introduced in 456 by Julius Caesar when it was noted that their 365 day year was about three days long with respect to the seasons. (Unhappily, the Roman calendar refused to allow the month of August to have an even number of days due to the emotional instability — and the addition of an extra day every fourth year helped to re-establish the balance.) This year lies just before the middle of the 19th century when it began to be realized that the Gregorian calendar was in error.

10

THIS MONTH we present a particularly seasonal offering, with a cross country puzzle in the shape of 1880. And up the grade this time — 20 pieces of two cassettes containing a pot-pourri of programs from the Michigan Radio Book, *Enter the Dragon*. Should keep you entertained through the winter months.

100

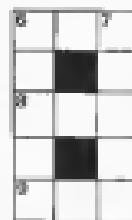
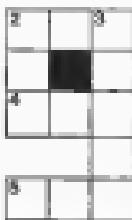
RE: **ITEM 10:** this section's purpose, all you have to do is send us the solution to the above dissatisfied people, using the printed clues — demonstrating how you solved it. **Right** — please don't send us answers containing your names — keep them **anonym**.

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129 REPORTER: YOU ARE  
130 ASKING FOR THE NAME OF YESTERDAY'S THIRTY-FIFTH DAY OUT OF RANGER 8000? 131  
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were occurring 10 days too late. In effect the Julian year was 11 days shorter than the Gregorian calendar. A third of this was to add eight days every thousand years. In 1571 Pope Gregory XIII introduced the Gregorian calendar to say that the century leap year had to skip the year 1000 because although by solar lunisolar should normally be reckoned as such but that the millennium year (e.g. 2000) should be. If you add the first in the first century containing 1000 it would mean that the year is still too long by 10 days so say you may need to make a note at the start of the year 2000 and not be a leap year!

obtained get in the shape of the plot 1980. Can you select values for A, B, C, D and E, such that the expression when evaluated will fit the plot?

Address	Down
0000000000000000	1 B-A
0000000000000001	0 C-B
0000000000000010	0 D-C
0000000000000011	0 E-D
0000000000000100	0 F-E
0000000000000101	0 G-F
0000000000000110	0 H-G
0000000000000111	0 I-H
0000000000001000	0 J-I
0000000000001001	0 K-J
0000000000001010	0 L-K
0000000000001011	0 M-L
0000000000001100	0 N-M
0000000000001101	0 O-N
0000000000001110	0 P-O
0000000000001111	0 Q-P
0000000000010000	0 R-Q
0000000000010001	0 S-R
0000000000010010	0 T-S
0000000000010011	0 U-T
0000000000010100	0 V-U
0000000000010101	0 W-V
0000000000010110	0 X-W
0000000000010111	0 Y-X
0000000000011000	0 Z-Y



Make sure that your name and address is printed clearly on your entry, and mark your envelope "Decorative Competition," or you run the risk of disqualification.

**As a tie-breaker, compare the following surfaces in 10 words or less:** "1984 is the Year of the Dragon Business."

Barber road April 20 by the last working day in February, with winners being announced in the April 1990 issue.

As usual, the Doctor's decision is final, and no correspondence on the competition can be entered into.

The twenty winners of our October

competition, who will be receiving copies of *Music Silver* (courtesy of Software Projects) very soon are as follows:

P M Cawley of Abingdon, P Rotherham  
 J Cau Gethin, G Davies of Gouraud,  
 Alan Hughes of Hounslow, B C Hastings  
 J Irwin, J J Letherwood of Ryedale, Russell  
 McDonald of Bridgwater, R D Whitelock  
 J Wormaldale, Stephen Savory of Peter-  
 port, Ken Caldwell of Rugby, P J Taylor  
 Acock, B M Evanson (late) of Bristol  
 J McDonough of Hanworth, A J Young  
 Dundas, J D High of Eltham, S P Morris  
 Daventry, A Wilson of BPPO 100, B G  
 Woods of Wivelstoke, B Lovell of Nunton, P

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